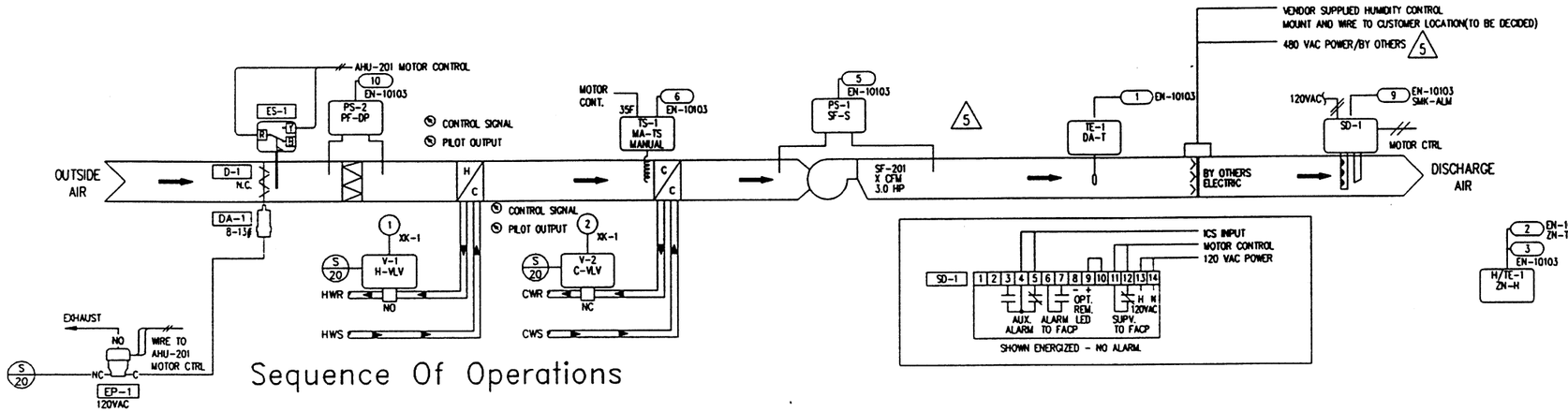
Air Handling Unit, AHU-201 Flow Diagram and Equipment Locations



Sequence Of Operations

SYSTEM: 100 Percent Outside Air Constant Volume Air Handling Unit
AHU-201

CONFIGURATION: Single discharge air setpoint
Constant Air Volume with one Supply Fan

Occupied Mode

Discharge Air Temperature Setpoint

The building operating engineer will set the discharge air temperature by adjusting the discharge air setpoint, DA-SP form any ISC terminal. The digital controller will modulated controlled devices as described below to maintain a fan discharge temperature of 55 F.(Adjustable)

Discharge Temperature Loop

The discharge cooling deadband is added to the discharge air setpoint. This value establishes the point at which mechanical cooling begins when the controller uses proportional only control. The digital controller will continually adjust the damper and mechanical cooling command in sequence according to the controller's result of the proportional-intergal cooling loop calculation. The digital controller modulates the controlled devices until the discharge air temperature equals the calculated discharge setpoint. The digital controller will continually adjust the heating command according to the controller's result of the proportional-integral heating loop calculation. The digital controller will modulate the heating control valve, V-1 until the discharge air temperature equals the setpoint. The controller will provide an output between 0 and 100 percent as the discharge air temperature travels through the proportional bands.

The state of 'Heating Mode' and 'Cooling mode' will lockout the operation of the controlled device, V-1 and V-2 if the respective mode is set 'OFF'. The PID control algorithm will sequence the heating and cooling devices so that both do not operate in the same proportional band.

Heating Mode

The digital controller will enter the heating mode at outdoor air temperatures below 45 F. The digital controller will position the cooling control valve at zero percent and the freeze protection pump will be turned on.

Cooling Mode

The digital controller will enter the cooling mode at outdoor air temperatures above 50 F. The digital controller will position the heating control valve at zero percent.

Warm-up/Cooldown

The warm-up/cooldown mode initiation will take place through a command from the higher level digital controller, MC-8 on a schedule basis. When mode active the AHU digital controller will start the fan system and will control at the occupied mode setpoints without the operation of the mixed air dampers. After the controller switches into the occupied mode, the mixed air system will be enabled.

Loss of Air Flow

Upon loss of air flow as determined by sensitive differential pressure switch, PS-1. The following controlled devices will be commanded to the following states:

Loss of Air Flow

Upon loss of air flow as determined by sensitive differential pressure switch, PS-1. The following controlled devices will be commanded to the following states:

- Heating valve, V-1 will remain in control.
- Cooling valve, V-2 will be positioned at zero percent.

Fan Status

Sensitive differential pressure switch, PS-1 will close upon air flow being present, this will set fan status ON. The digital AHU contoller switch to normal control.

Humidity Control

Packaged humidifier will have self contained controls. An alarm will be provided from the humidifier to the ICS.

Unoccupied Mode

The supply fan will remain off and the controlled devices will be commanded to the positions indicated above under 'Loss of Air Flow'.

Power Fail Restart

The power fail restart will delay the startup of the digital controller for 1 minute (adjustable at the operator workstation) after a power failure for controller reset condition. This logic will hold the controller in the sutdown mode until the restart timer has expired.

Sensitive differential pressure switch, PS-2 will close and the AHU digital controller will send a primary filter alarm to the ISC network.

Heating discharge low limit temperature switch, TS-1 will stop the supply fan and the AHU digital controller will issue an alarm to the ISC network in the event that the heating discharge temperature drops below 35 F.(Adj.)

Supply smoke detector, SD-1 will open a control circuit and the AHU digital contoller will issue and alarm to the ISC network in the event the respective device senses smoke at the location.

The following point objects will be adjustable from any ICS terminal:

-Discharge air setpoint
-Heating and Cooling lockout setpoints

The following point objects will be monitored/alarmed at any ICS terminal:

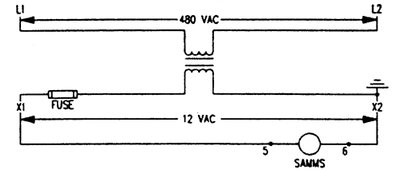
-Electric low limit temperature switch, TS-1 status
-Mixed air filter differential pressure alarm, PS-3
-Supply fan status, PS-1
-Smoke detector, SD-1 status
-Humidifier alarm

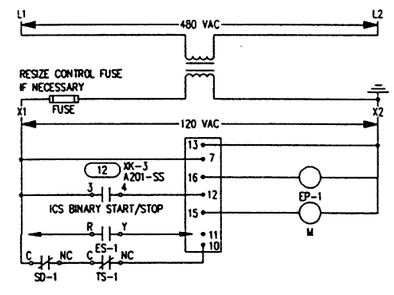
FIELD MATERIAL

DEVICE TAG	QTY	CODE NUMBER	DESCRIPTION
D-1	1	---	SEE DAMPER SCHEDULE
DA-1	1	D-3153-2	DAMPER ACTUATOR 8-13#
ES-1	1	8021-CVP	END SWITCH
H/TE-1	1	ME-6300-1	HUMID/TEMP TRANS; 0/100%
PS-1-PS-2	2	P32AF-2C	SENSITIVE DIFF PRES CTL
	4	FTG18A-600R	REMOTE MTD PROBE
SD-1	1	D4185IAC-2	DUCT DETECTOR, ION,
	1	ST-10	SAMPLING TUBE FOR
TE-1	1	TE-6001-1	MOUNTING HARDWARE
	1	TE-6000-4	1000 OHM, NI RTD
TS-1	1	A70NA-1C	TEMP CONTROL 4 WIRE, 2-C
V-1-V-2	2	----	SEE VALVE SCHEDULE
ACC	4	G-2010-5	AIR GAGE 1-1/2"
EP-1	1	V-2410-2	VALVE, SOL.AIR, 3-WAY

ANY MATERIAL WITH A (P) PRECEEDING THE DEVICE TAG IS CONSIDERED PROPRIETARY EQUIPMENT AND IS BEING SUPPLIED BY JOHNSON CONTROLS, INC. ALL OTHER MATERIAL IS NON-PROPRIETARY EQUIPMENT.

4 Motor Control





FILE: AHU-201H
DCODE: 19930628.1443

		AS BUILTS		09/19/92 DCS
	4	GENERAL		07/15/92 SF
	3	GENERAL		04/23/92 SF
REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE BY

SALES ENGR	PROJECT MGR	APPL. ENGR	DRAWN	APPROVED
JP	SF	DCS	BY SF DATE 11/21/91	BY DATE

DRAWING TITLE
Air Handling Unit, AHU-201
Building 411, Linac Injection
100 Percent Outside Air
Single Path Htg/Clg Unit

PROJECT
The Argonne National Labs
Advanced Photon Source Campus
9700 Cass Avenue South
Argonne, IL 60439

JOHNSON CONTROLS
Systems & Services Division

3007 MALMO ROAD
ARLINGTON HEIGHTS
ILLINOIS 60005
708/364-1500 Main
708/806-4438 Eng

CONTRACT NUMBER
91390-0009

DRAWING NUMBER
91-9-B-05A